

## CLAIMS:

### THERE IS CLAIMED:

1. An aspheric-surface processing method using a cutting apparatus comprising at least one turning tool movable in the same direction as a rotating axis of a work and in a direction perpendicular to the rotating axis of the work, the method comprising:

moving the turning tool at a predetermined feed pitch in a fixed direction over at least a part of a region of the work extending from a center of the rotating axis of the work to a peripheral portion of the work; and

moving the turning tool in another direction perpendicular to the rotating axis of the work in order to process the work for forming an axis-asymmetric aspheric surface.

2. The aspheric-surface processing method according to Claim 1, further comprising controlling the cutting apparatus such that a center of a leading edge of the turning tool is positioned along a line being normal to a work surface of the work and extending through a work position of the work.

3. The aspheric-surface processing method according to Claim 1, further comprising controlling such that the turning tool starts the processing operation in a state in which, in the another direction perpendicular to the rotational axis of the work, the distance between the center of the rotation of the work and the leading edge of the turning tool or the distance between the periphery of the work and the leading edge of the turning tool is near zero.

4. The aspheric-surface processing method according to Claim 2, further comprising controlling the cutting apparatus wherein the turning tool starts the processing operation in a state in which, in the another direction perpendicular to the rotational axis of the work, the distance between the center of rotation of the work and the leading edge of the turning tool or the distance between the periphery of the work and the leading edge of the turning tool is almost zero.

5. The aspheric-surface processing method according to Claim 1, wherein cutting conditions of the cutting apparatus are set in a following ranges:

the rpm of the rotations of the work are from 100 to 3000;

the feed pitches for the moving operation are from 0.005 to 0.2 mm/rev.;

and

the amounts of incisions for the moving operation are 0.05 to 3.0 mm/pass.

6. An aspheric-surface forming method comprising:

roughing a work rotatable about its rotating axis, for forming a configuration closely analogous to a desired configuration; and

finishing the work for forming the desired configuration by processing the work in accordance with an aspheric-surface processing method;

wherein said aspheric-surface processing method comprises moving a turning tool at a predetermined feed pitch in a fixed direction over at least a part of a region of the work extending from a center of the rotating axis of the

work to a peripheral portion of the work and moving the turning tool in another direction perpendicular to the rotating axis of the work.

7. The aspheric-surface forming method according to Claim 6, further comprising controlling the turning tool wherein a center of a leading edge of the turning tool is positioned along a line being normal to a work surface of the work and extending through a work position of the work.

8. The aspheric-surface forming method according to claim 6, further comprising controlling the turning tool wherein the turning tool starts the processing operation in a state in which, in the another direction perpendicular to the rotational axis of the work, the distance between the center of the rotation of the work and the leading edge of the turning tool or the distance between the periphery of the work and the leading edge of the turning tool is near zero.

9. The aspheric-surface forming method according to claim 6, further comprising chamfering the peripheral portion of the work.

10. An aspheric-surface processing method using a cutting apparatus comprising at least one turning tool movable in the same direction as a rotating axis of a work and in a direction perpendicular to the rotating axis of the work, the method comprising:

moving the turning tool at a predetermined feed pitch in a fixed direction over at least a part of a region of the work extending from a peripheral portion of the work to a center of the rotating axis of the work; and moving the turning tool in another direction perpendicular to the rotating axis of the work in order to process the work for forming an axis-asymmetric aspheric surface.

11. The aspheric-surface processing method according to claim 10, further comprising moving the turning tool at a different predetermined feed pitch in the fixed direction over another part of a region of the work.

12. The aspheric-surface processing method according to claim 11, further comprising moving the turning tool at a lower predetermined feed pitch in the fixed direction over a peripheral region of the work.